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REPORT

50X1-HUM

CD NO.

COUNTRY USSR

DATE OF  
INFORMATION 1950SUBJECT Scientific - Chemistry, rubber and science  
organization, rubber researchHOW  
PUBLISHED Bimonthly periodical

DATE DIST. 6 Dec 1950

WHERE  
PUBLISHED Moscow

NO. OF PAGES 2

DATE  
PUBLISHED 1950

LANGUAGE Russian

SUPPLEMENT TO  
REPORT NO.

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SOURCE Kolloidnyy Zhurnal, Vol XII, No 4, Jul - Aug 1950, pp 311-312.B. A. DOGADKINS. S. Voyutskiy  
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The following article reviews Dogadkin's activity in the field of rubber chemistry, physics, and technology. It mentions investigations on the effect of oxygen in vulcanization, development of procedures for the recovery of rubber, and investigations in the field of emulsion polymerization leading to the industrial production of types of rubber which are resistant to low temperatures.

The date 1 July, 1949 marked the 25th anniversary of Boris Aristarkhovich Dogadkin's scientific activity. Dogadkin's scientific career was launched while he still was a student at the State Scientific Research Institute imeni K. A. Timiryazev. In 1929, he joined the staff of the Institute of Rubber Industry (at present Institute of Tire Industry), where he is still active in the capacity of chief of the Department of Rubber Chemistry and Physics. Simultaneously, Dogadkin first held the position of assistant professor of the Chair of Colloid Chemistry at Moscow University and later that of docent of the Chair of Physical Chemistry of the Moscow Petroleum Institute. In 1934, he was elected professor of the Chair of Rubber Chemistry and Physics (a chair which he had organized at the Moscow Institute of Fine Chemical Technology imeni Lomonosov).

Dogadkin achieved considerable eminence as a teacher. In 1938, he published the monograph Science of Rubber, which was later rewritten into a textbook. In 1945, he was awarded the Order of the Labor Red Banner.

In the course of his scientific activity, Prof Dogadkin published about 80 papers in USSR and foreign journals. He initiated in the USSR investigations on the emulsion polymerization of dienes for the purpose of obtaining synthetic rubbers and varieties of synthetic latex, which led to the industrial production of rubber that is resistant to low temperatures. On the basis of these investigations,

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Dogadkin formulated a theory of emulsion polymerization, establishing relationships which permit one to determine the quality of the resulting rubber. In 1941, he received the Stalin Prize for work in this field.

Dogadkin clarified the role which molecular oxygen plays in structural changes of rubber, particularly in the course of the vulcanization process. As far as vulcanization of synthetic rubbers is concerned, he carried out investigations in the field of kinetics, advanced a theory explaining occurrence of an optimum, and brought out peculiarities which occur in the vulcanization of synthetic rubbers. Upon clarifying the structural differences between the soluble and insoluble fractions of rubbers, Dogadkin demonstrated the possibility of transferring insoluble rubbers and vulcanized products into the soluble state by treatment with molecular oxygen. He also developed catalysts for the solubilizing oxygen reaction. The process of destructive solution of vulcanized products which was discovered by Dogadkin has been applied in developing efficient procedures for the recovery of rubber. A thorough investigation of the role played by oxygen in plastification, recovery, and the aging of rubbers has led to a clarification of many questions connected with these industrial processes, particularly as far as synthetic rubbers are concerned.

Dogadkin gave a correct picture of the state of rubber in solution after investigating the problem of this state by the method of surface tension measurements at the solution-water boundary. He also was the first to develop and apply a light scattering method for the determination of the molecular weight of rubber. Furthermore, he investigated and clarified the mechanism of structural modification of dissolved rubber under the action of light.

Dogadkin initiated in the USSR investigations of the structure of the typical and most widely used grades of rubber containing carbon black. For these investigations, the electron microscopic method was used and entirely new methods were developed which combine a study of the kinetics of swelling of the rubber in question with measurements of electrical conductivity and dielectric properties. On the basis of these investigations, the dependence of mechanical properties and resistance to use on the type of distribution of the filler was established and conditions bringing about the formation of various structures were defined.

Lately Dogadkin and his students have worked successfully on the kinetics of elastic deformations of crude and vulcanized rubber. One of the results of this work consisted in the introduction of a significant correction into Maxwell's equation by establishing that there is a square power relationship between tension and the constant of relaxation. In the course of this work, the effect of swelling in various softeners on relaxation and fatigue strength of rubber was studied.

In the field of technology, Dogadkin's work has solved practical problems in connection with the production of synthetic latex, production of special grades of hard rubber, recovery of rubber, manufacture of rubber products from latex, etc.

Dogadkin created a Soviet school of investigators in the field of physics and chemistry of rubber. Among his pupils and collaborators, there are four doctors and 16 candidates of sciences. During 1936 - 1938, Dogadkin was chairman of the Bureau of the Scientific-Technical Rubber Society. At present, he is member of the Central Council of the Mendeleev Society, chairman of the Society's Colloids Section, and member of the Bureau of the Section of High Molecular Compounds of the society. Since 1945, Dogadkin has been associate editor of Kolloidnyy Zhurnal published by the Academy of Sciences USSR.

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